

NASA TECH BRIEF

John F. Kennedy Space Center



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

A Method for Economic Evaluation of Redundancy Levels for Aerospace Systems

Accurate projection of costs has been of great concern to management in economic evaluation of equipment redundancy for aircraft and multimission spacecraft. With the accumulation of experience, however, management is beginning to treat the economics of redundancy levels more accurately. To accelerate this trend, a report has been published which presents a systematic approach for estimating the economic consequences of various redundancy levels for aerospace systems.

The report discusses three phases as described below.

1. Phase A provides documentation describing the use of a previously developed "Update Redundancy Cost Criterion Nomograph."
2. Phase B provides an updated description of the previously developed "Launch Go/No Go Criterion."
3. Phase C develops an expanded cost-criterion redundancy selector which integrates Phases A and B.

The principle behind the economic evaluation of redundancy levels is based on the integrated redundancy selection criterion. It comprises primary cost impacts, such as operational delays, reflight missions due to aborts, procurement of equipment, and vehicle expansion to accommodate additional equipment. Economics of optimal redundancy, therefore, are estimated by the criterion which is relatively insensitive to impertinent cost factors.

The nomographs developed in this report enable "table top" sensitivity analysis to be performed. This tool gives good, clear answers but is not recommended for multiple configuration analysis when a large amount of equipment is involved because of the complex iterative process employed. In these cases, a more efficient computerized method of performing these multiple analyses is recommended.

Note:

The following documentation may be obtained from:
National Technical Information Service
Springfield, Virginia 22151
Single document price \$7.50
(or microfiche \$0.95)
Reference: NASA CR-128494 (N72-29975) Program Management Aid for Redundancy Selection and Operational Guidelines

Source: P. W. Hodge and B. Frumkin of
Grumman Aerospace Corp.
under contract to
Kennedy Space Center
(KSC-10754)

Category 09